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ABSTRACT

This investigation studied the development of certain predicates called factives, such as "sad," "happy," "know," and "true," by studying the semantic effects of negation on the complements of both factive and non-factive predicates. The subjects were 60 children, divided into three age groups of ten boys and ten girls each; group one, ages 3 1/2 to 4 1/2; group two, ages 4 1/2 to 5 1/2; and group three, ages 6 to 8. The children's comprehension of factive and non-factive predicates was studied by having them choose one of two possible agents after hearing affirmative and negative factive and non-factive sentences. They could choose the agent mentioned in the complement, thus affirming the complement, or choose the unmentioned agent, thus denying the complement. Competence increased into the early school years; the oldest subjects showed a fair mastery of the factive predicates of the study and also showed both general and fine discrimination of the semantics of the non-factive predicates, particularly between the semantics of "true" and "posible" versus those of "think," "want," and "desire," The simplest factive, "knov" was comprehended earliest of the studied factives. Affective factives such as "happy" and "nice" were acquired later. (MKM)

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Some Facts About Learning About Factives

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Some Facts About Learning About Factives

We are accustomed to thinking of the meaning of a word as inhering the reference of the word by itself. Dog, for example, refers to each member of the class of dogs. The meaning of a large number of words, however, sets requirements on the meaning of other morphemes in the sentence. Part of what one learns in acquiring the meaning of the term elderly, for example, is that it not only means "old," but also is only predicated of human or human-like entities. One speaks of a man being elderly or not, but not a rock or a planet.

Such subtle restrictions on the morphemes that appear in a sentence with a predicate already present difficulties for a child as he learns the meaning of relational terms. Children must in fact also learn, as part of the meanings of various predicates[1], how their meaning is related to the meaning of entire sentences that they may take as their complements. Kiparsky and Kiparsky (1970) have discussed how a speaker's use of certain predicates, which they call factives, implies that he presupposes, or assumes, the truth of their sentential complements. For example, in (1) the predicate happy is a factive, which takes as its sentential complement the clause that the teacher eats horsemeat:

(1) Susan is happy (that the teacher eats horsemeat).

In (1), the speaker is understood to assume the truth of the proposition that the teacher eats horsemeat, and describes Susan's reaction to this fact. A classic test for a predicate being of the factive type is that the sentential complement is assumed to be true whether or not the factive predicate is negated.

Compare (2) and (3):

(2) Susan is happy (that the teacher eats horsemeat).

(3) Susan isn't happy (that the teacher eats horsemeat).

In both (2) and (3) the speaker presupposes the truth of the teacher's eating horsemeat as a given fact: whether Susan is happy about it or not does not affect the truth of the complement. Other examples of factive predicates include sad, surprising, and know. Again negation of the predicate does not affect the assumed truth of the predicate does not affect the assumed truth of the sentential complement:

(4) It's surprising / not surprising (that Harriet showed up for her exams).

(5) George knows / doesn't know (that everyone dislikes him)[2].

Contrastively, the meaning of non-factive predicates carries no assumption of the truth of the complement. The predicate want, like happy, for example, denotes a positive reaction towards something, but only to a possibility, not an established fact, as is clear in (6)

(6) Harriet wants / doesn't want (scallops to be socialists).

Other non-factives, such as true, false, or possible, are used to make assertions about the likelihood of the sentential complement. There is a clear change of believed likelihood under negation:

(7) It's true / not true (that General Motors owns Iceland).

(8) It's possible / not possible (that Marie is wearing a wig).

Below we have summarized some major characteristics of factive and non-factive predicates.

Factives	Non-factives
Sentential complement presupposed to be true	Sentential complement not assumed true
Truth value of complement unchanged by negation of predicate	Likelihood of complement often changed under negation of predicate

The proper use of factives and non-factives requires knowledge, then, not only of the central meanings of the predicates - for example, that both happy and want entail a positive emotional reaction towards something - but also of the presence or absence of the presupposed truth of their complement sentences. This in turn implies and is accompanied by an ability to gauge properly the effect of the presence or absence of negation of the predicate on the likelihood of the sentential complement. It is the latter problem of the differential consequences of negating the predicate that the present study is concerned with. With an exception to be discussed later (Harris, 1975), our knowledge of the interaction of the semantics of negation and its semantic effect on the interpretation of embedded complement sentences (such as the complements of factives or non-factives) is presently quite sparse.

Operationally, we took our major means of testing from the fact that the classic test for the factivity of a predicate is the unchanging truth value of its complement when the predicate is negated, as in (2) and (3):

(2) Susan is happy that the teacher eats horsemeat.

(3) Susan isn't happy that the teacher eats horsemeat.

We predicted that younger children might spread the negation of the factive sentence into the complement, thus sometimes interpreting a sentence such as (3) as indicating that the teacher does not in fact

eat any horsemeat.

At the same time, it was necessary to know whether children could interpret a predicate negation as having any effect on the interpretation of the complement sentence in a pair like (9)

(9) It's not true that the dog will bark.
true

Either as a problem in competence or as an experimental task strategy, younger children might only pay attention to the terminal complement sentence, particularly in an experimental task of the kind we employed (cf. Methods section). We investigated the development of factivity, then, through studying the semantic effects of negation on the complements of both factive and non-factive predicates.

We also had some interest in whether the development of factivity proceeded more quickly in some predicates (or factive-non-factive predicate pairs) than others. Consider the predicates know and (be) happy, illustrated in (10) and (11):

(10) John knew that Marion ate the pudding.

(11) John was happy that Marion ate the pudding.

Both know and happy are factives. But clearly know is the simpler factive, and its meaning is contained in that of happy. Know denotes a simple state of awareness of a truth; happy denotes a conjunction of being aware of some truth and also having a positive emotional reaction to it. Given that middle-class children have some notion of the uses of know and happy by the ages of three and a half (Brown, 1973; Borke, 1973; Limber, 1973), we might still expect that the knowledge of know as a factive would precede knowledge of happy. So another aspect of the study was the inclusion of a variety of factive and non-factive predicates as material for study.

Method

Subjects

The subjects were 60 children, divided into three age groups of 10 boys and 10 girls each: Group I (3-6 through 4-5, mean age = 4-2), Group II (4-6 through 5-5, mean age = 5-0) and Group III (6-0 through 7-11, mean age = 7-1). Children in Groups I and II attended a Minneapolis nursery school, and children in Group III were enrolled in Saturday morning art classes at the University of Minnesota. All subjects were of middle to upper-middle class backgrounds.

Materials

The basic methodological problem was to discover whether or not the subjects believed the complement sentence held true under various conditions of negation or affirmation of factive and non-factive predicates. One possible procedure is simply to ask the child whether or not the state of affairs described by the complement is true; for example, a child might be told "It isn't $\begin{matrix}\text{true}\\\text{nice}\end{matrix}$ that the fish slides down the hill." Then he could be asked "Does the fish slide down the hill or not?" (Harris, 1975). It was our intuition, however, that an actional response might be easier for the children than a judgment. In our procedure, the child was forced to make a choice between two possible agents for an activity described by the complement. One of the agents was mentioned in the complement, the other not. So, for example, a child would have in front of him a fish, a bunny, and a tree, and hear the sentence "It isn't surprising that the fish pushed the tree." Since surprising is a factive, its negation does not affect the truth of the complement that the fish pushed the tree, and so the fish should be chosen. For the non-factive true, a negation should dictate choice of the unmentioned agent: "It isn't true that the fish pushed the tree" implies that the bunny must have.

In order to discover whether the child was able to choose an agent by negative inference in the manner required, and also to acquaint him with the task, each subject was first presented with two each of simple affirmative and negative sentences (no complements) with the same forced-choice-of-agent context. Examples included:

(12) The girl drives in the car (with a boy and girl present).

(13) The boy doesn't go down the hill (with a boy and girl present).

The experimental sentences consisted of 40 sentences: 10 with affirmative non-factive predicates; 10 with negated non-factive predicates; 10 with affirmative factive predicates; 10 with negated factive predicates. There were five each of each type of predicate (non-factive and factive), each appearing twice in affirmative and twice in negative sentences. The factive predicates were know, surprising, happy, nice and sad. The non-factive predicates were think, possible, desire, true and want. The sentences were arranged into two blocks, one block of 20 factives, both affirmative and negative, and one block of 20 non-factives, affirmative and negative. Within each block, affirmative and negative sentences alternated with one another. There were 10 complement sentences used with the predicates; each was used once in the second set. No factive or non-factive predicate was ever followed by the same complement sentence.

The complement sentence itself consisted of an animate agent (e.g., the fish) and an easily acted out action on another object (e.g., pushes the tree), always given in the present tense. The available complement agent choices were fish/bunny or a boy/girl. In a given factivity block for a given child, the same two agents were always present (e.g., the fish or bunny would be used in all of the factive sentences). Half of the children had the fish and bunny for the factives, half had them for the non-factives.

Below are examples of the types of sentences used in the study, with the questions asked by the experimenter and appropriate responses by the subject:

(14) Factive Affirmative:

It's surprising that the bunny eats dinner.

Question: Who eats dinner?

Response: The bunny (child then makes the bunny carry out the eating). or answers "the bunny."

(15) Factive Negative:

It isn't nice that the fish pushes the tree.

Question: Who pushes the tree?

Response: Mentioning the fish, then using it.

(16) Non-factive Affirmative:

It's true that the boy sleeps in the bed.

Question: Who sleeps in the bed?

Response: The boy.

(17) Non-factive Negative:

It isn't true that the girl bumps into the duck.

Question: Who bumps into the duck?

Response: The boy.

Note that the non-factive negative is the sentence in which choice of the unmentioned agent is most appropriate.

Some aspects of the materials deserve comment. For some predicates, the neutral dummy subject it (as in it isn't true, or it's nice) cannot be used. It is strange to say It thinks that the girl will sit down. For these predicates, the experimenter held a hand puppet named Dumbo, who was named as the animate subject of the predicate where necessary, as in (18):

(19) Dumbo doesn't think that the boy rides in the boat.

Another feature of the materials was the use of ungrammatical sentence forms with two of the predicates, want and desire. These two predicates do not generally take complements of the form that + S. It is awkward or ungrammatical to say Dumbo wants that the boy sits on the chair. Both predicates generally take infinitival complements instead (e.g., Dumbo wants the boy to sit on the chair). Nevertheless, since we wished to avoid any differences in response that might be caused by the different complement forms, all predicates in the study were followed by complements of the that + S, including the predicates want and desire.

Procedure

Each child was tested individually by the same experimenter in a room at his school, seated on the floor, with the necessary toys in front of him. The child was then told that one of the agent toys was to do something, and he would find out which one by listening carefully; the child was also asked to repeat what the experimenter said (we wanted to make sure that the child actually processed the negative particle in negative sentences). The warm-up simple sentences were presented. While the experimenter asked the question, she pointed to the dolls. After the child answered the question, he was encouraged to perform the appropriate activity for the complement if he had not done so spontaneously.

After the warm-up sentences were done, the child was asked if he had any questions. The experimental sentences were then presented, half of the subjects receiving the factive sentences first, and half receiving the non-factives first. One child refused participation from the study from the beginning. No child who participated had any difficulty with the warm-up sentences, and all children completed the entire procedure in one sitting.

Results

Scoring

As will be recalled, the critical response was whether or not the child chose the mentioned complement agent as the actor. We shall refer to choice of the complement actor as affirming the complement, and to choice of the unmentioned actor as denying the complement in subsequent discussions. For factive sentences, both negative and affirmative, the correct response was always to affirm the complement by choosing the mentioned agent to carry out the activity. In the case of non-factives, responses cannot strictly be held to have been accurate or inaccurate except in a few cases. Consider the two non-factive sentences:

(19) Dumbo thinks that the girl rides in the boat.

(20) Dumbo doesn't think that the boy bumps into the duck.

We might expect that an agreeable child who understands the semantics of think would be more likely to affirm the complement in (19) (have the girl ride in the boat) and deny the complement in (20) (not choose the boy). But he need not do so, since what Dumbo thinks or does not think is only Dumbo's opinion. The case is similar for the non-factives want and desire and the affirmative form of possible. In the affirmative version, only true strictly requires affirming the complement, and in the negative versions, only true and possible require denial of the complement. So in general we can only expect knowledgeable subjects to show a strong tendency to affirm the complement of affirmative non-factives and deny the complement of negative non-factives.

General Analyses

Rather than an analysis of the results in terms of simple accuracy, the chosen unit of analysis was how often a child denied the complement in response to the different sentence types. These

results are presented in Table 1.

Insert Table 1 about here

The general trend is clear. Denying the complement becomes more common as a response to negative non-factive sentences. In the other three categories, affirming the complement becomes more frequent with age. In particular, the difference between affirmative and negative factive sentences has largely vanished in Group III.

More specific analyses substantiate these impressions. It was predicted earlier that younger children would show some tendency to overextend the negative interpretation into the complement of factive sentences, thus denying the complement of factives such as Dumbo isn't happy that the girl slides down the hill. Overall the subjects denied the complement more often for negative factives than for affirmative factives ($F(1,19) = 24.41$, $p < .001$). The tendency to treat the negative and affirmative factives differently diminshed with age ($F(2,19) = 4.99$, $p < .05$), and in Group III, there remains no difference in the responses to the two factive sentence types ($t(19) < 1.00$, $p > .20$).

Similar analyses for the non-factive sentences show that the children more often denied the complements of negative than affirmative non-factives ($F(1,19) = 92.69$, $p < .0001$); the difference is reliable in Group I ($t(19) = 3.89$, $p < .001$) and increases with age ($F(2, 19) = 5.07$, $p < .05$).

As expected, then, children's response to factive and non-factive predicates becomes more differentiated with age. By middle childhood the factive-non-factive distinction was generally well-developed. The generality of these analyses, however, obscures differences among the subjects within groups, and perhaps more important, the differences

among the responses to the various predicates. These topics are treated in the following sections.

Response Patterns

Individual Patterns: Overaffirmers. The most surprising category of subjects consisted of a large number of children, mostly younger, who rarely or never denied the complement. A child was classified as an overaffirmer if he failed to give as many as three complement denials in any one of the four sentence categories. The resulting group of seventeen subjects each gave an average of 0.82 complement denials in response to all forty sentences. Nine of the twenty Group I children were overaffirmers; the number dropped to five and three in Groups II and III respectively.

Overaffirmers may have had a systematic difficulty in linguistic competence. But the difficulty likely stemmed at least in part from a task-specific strategy, especially given that overaffirmation was found even in a few Group III children. Only the complement sentence was questioned and was to be acted out, and these subjects probably paid attention only to the clause that described the relevant activity. A similar strategy of paying attention only to a last subordinate clause if it could be independently analyzed has been found by Winston (1974) and Harris (1975) in other tasks involving the comprehension of complex sentences. Since there is some chance that these subjects' responses were largely the result of only a partial analysis of the test sentences, their responses are not included in the analysis of results for the individual predicates.

Predicate Analysis: Factives. A child was classified as having comprehended a factive predicate correctly if he affirmed the complement of all four examples of the factive (two negative and two affirma-

tive). The resulting patterns of response are given in Table 2, along with overall accuracies for the different factive predicates.

Insert Table 2 about here

Of the forty-three subjects who were not overaffirmers, eleven did not pass any of the predicates, while eighteen, twelve of them subjects in Group III, passed all five. The most interesting group consists of fifteen children who passed at least one predicate but not all five. As predicated earlier, the simplest factive, know, appears to be the earliest acquired factive. Of the fifteen children who knew one to four of the factives, all but one comprehended know correctly. At the other end of the scale were the factives nice and happy, happy being known by just three of the children who did not know all five predicates, and nice being known by four. The general tendency was for the more epistemological predicates (know, surprising) to be easier than the predicates expressing an emotionally evaluative reaction (sad, nice, happy).

To some degree these results are consistent with reasonable pragmatic reactions to the predicates. When the children heard sentences such as

(21) Dumbo's not happy that the boy eats dinner.

their reaction may have been to attempt to rectify the situation, which would lead to errors in response for both happy and nice. But it is not clear how powerful pragmatic factors alone were in the test situation. On the same grounds, children might have been expected to choose the unmentioned actors more often in response to the affirmative versions of surprising (It's surprising that . . .) or sad (It's sad that . . .). Surprising, however, was approximately as

good a factive as the neutral know; and while the affirmative form of sad received a rather high rate of complement denials in Group I, so did the negative form (It's not sad that . . .). Probably a lack of firm competence in the factive senses of happy and nice is responsible for much of the difficulty. The problem may also arise partly from use around the child of sentences such as "It's not nice for you to take away your brother's toy (stop it)." Generally, predicates denoting emotional attitudes refer not only to what is or is not the case, but also indirectly to what is desirable, a fact that may hinder learning the presuppositional nature of affective factives such as sad, happy, and nice.

Predicate Analysis: Non-factives. As discussed earlier, aside from the negative versions of possible and true and the affirmative version of true, the non-factive sentences cannot strictly speaking be said to have required one answer or another. Their major use in this investigation was to provide a contrastive test to that for the factive predicates. We analyzed affirmation of the complement as correct for affirmative non-factives, and denial as correct for the negatives, the overall proportions for each non-factive predicate are presented in Table 3. In general, children gave reliably more

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Insert Table 3 about here

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denial responses to the negative versions than to the affirmative versions for each predicate in each Group ($p < .05$, two tails). The most interesting result is obtained in Group III's reaction to the various nonfactives. In responding to not true and not possible, Group III subjects denied the complement .97 and .91 of the time, i.e., nearly always. But when hearing that Dumbo did not think, want, or

desire something, the average rate of complement denial was just .64, as is appropriate; for just because Dumbo did not think, want, or desire something does not mean it does not happen, unlike the case when something is not possible or not true. This difference in the response to the true-possible vs. think-want-desire negative is highly reliable in Group III ($t(16) = 3.38$, $p < .005$). The difference is nonexistent in either Group I or Group II; a clear developmental advance is shown in the understanding of the fine details of meaning of the non-factive predicates.[3]

Discussion

The overall results indicate a slow progression in competence in understanding factive and non-factive predicates, with reasonably good competence in the early middle childhood subjects of Group III. The results do not support a sudden or clear acquisitional step in the acquisition of factive predicates, a finding which is not surprising on considering the nature of the acquisition. Factivity is not a semantic distinction that is marked in any uniform way by the phonological or syntactic form of predicates or the syntax of the surrounding sentence. In this respect it may be contrasted to a meaning such as that of the past tense in English, which (aside from irregular verbs) is marked by a small set of phonologically similar allomorphs (generally spelled -ed orthographically) or by forms of a single word do. In the acquisition of factive and non-factive predicates, for each predicate, aside from learning the core meaning of the term, the child must learn whether or not the predicate takes complement arguments at all, and then whether or not the truth of this complement is presupposed; no grammatical marker gives any cues in this acquisition.[4] It is quite doubtful that children

ever encode factivity as a unitary process or rule in the same manner they may formulate various grammatical markers. The "acquisition of factivity" becomes a study of the acquisition of different predicates. What might also be expected to develop is a quicker learning of the factivity or non-factivity characteristics of new predicates; the work undertaken here, however, offers no information about this more subtle question.[5]

We should also note that if anything, the results of this study probably lead to an underestimation of children's comprehension of factive predicates. In general a given competence can be expected to function at different levels in different situations: in the experimental situation without supporting context usage is probably less accurate than in more normal contexts. More particularly, a peculiar artificiality of testing factives in our experimental context ought to be pointed out. Factives are generally used to comment on someone's reaction or awareness of a state of affairs the speaker presupposes to be already true. The content of the complement refers to this presupposed, old information, and the factive predicate to further information. In our experimental situation, in contrast, the child listening to a sentence such as "Dumbo's not happy that the boy eats dinner" must infer the presupposed truth of the complement from the use of the factive. What is normally presupposed and already known has instead to be deduced. Thus it follows that competence in the experimental situation constitutes a definite extension of normal competence. What we take for granted as a simple test of a competence is really a sharp test of that competence plus other competencies.

Summary

Children's comprehension of factive and non-factive predicates was studied by having them choose one of two possible agents after hearing affirmative and negative factive and non-factive sentences: they could choose the agent mentioned in the complement (thus affirming the complement) or choose the unmentioned agent (thus denying the complement). Competence increased into the early school years; the oldest subjects showed a fair mastery of the factive predicates of the study; they also showed both general and fine discrimination of the semantics of the non-factive predicates, particularly between the semantics of *true* and *possible* vs. those of *think*, *want*, and *desire*). A general acquisitional tendency was found for the factive predicates. As predicated, the simplest factive *know* was comprehended earliest of the studied factives. Affective factives such as *happy* and *nice* were acquired later.

The nonunitary nature of the acquired competence was also discussed. In particular it was pointed out that 1) factivity is not a grammatically marked unitary operation, and must probably be formulated anew in the learning of each predicate, leading to what appears to be a gradual acquisition pattern and 2) the test of factive comprehension employed here itself demanded a competence beyond that of normal use, requiring both semantic competence and a deduction in the experimental situation from that use.

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Footnotes

[1]We use the term "predicate" to refer to any verb or adjective.

[2]Know does have some uses which are not factive. Sometimes when know is pronounced with emphasis, it may simply denote enormous certainty, for example, "Harriet just knew that she would become famous (but she was wrong)," or "I just know that spring will come early this year," Predicates are rarely characterized by perfect factivity, and important complications in the description of factives have been discussed by various writers (e.g., Karttunen, 1971).

[3]These differences did not appear reliably in the responses to the affirmative predicates; the rate of affirmation was generally high. Thus the differences, caused by a combination of the meaning of the predicates and pragmatic factors, were most apparent in the negative sentences. Pragmatic factors in the factives, if they were operating, appeared most sharply in the negatives of happy and nice (cf. earlier discussion), so there may be a particular susceptibility of the negative sentences to such influences.

[4]Kiparsky and Kiparsky (1970 have pointed out general tendencies for factive predicates to take complements of gerundial form and non-factives to take complements of infinitival form. These are, however, no more than tendencies, and do not form a sharp or reliable cue.

[5]Our discussion would not be complete without a comparison with results obtained by Harris (1975), who studied factives, non-factives, and couterfactuals. In the relevant procedures, Harris presented his subjects with sentences incorporating the factives know and happy and the non-factives say and whisper. Each predicate appeared

in all four of the following affirmative-negative combinations: affirmative main predicate-affirmative complement, negative main predicate-affirmative complement, affirmative predicate-negative complement, negative predicate-negative complement, the first two of these corresponding to the categories used in the present study. Each subject was read the relevant sentence, for example "David didn't say he was in trouble" and asked about the truth of the complement "Was David in trouble?", after being informed that answers should be either "yes," "no," or "can't tell."

As in the present study, Harris found most development in the response to factive predicates occurring towards the beginning of the school years. He does not report results separately for the predicates know and happy, so it cannot be ascertained whether or not the same comprehension differences between the predicates were obtained.

Harris' results from testing the non-factives say and whisper present greater disparities. Only a small minority of subjects chose, as they should have, the "can't tell" alternative, most preferring to say either "yes" or "no." In saying "yes" or "no" the subjects generally responded differentially to the negative and affirmative non-factives in the appropriate direction, but the discrimination was not very sharp, and there was a strong tendency to affirm the complement in both conditions. Harris' own suggestion is that subjects made "the pragmatic inference that if someone says or whispers something, it is probably true, and thus they will interpret Non-factives with Factive truth conditions" (thus leading to a strong tendency to affirm the complement). But in fact more of Harris' subjects agreed to than denied an affirmative complement even when told someone had not said or whispered something. E.g., given a sentence such as

"Harry didn't say he was in the yard," subjects tended to say at all ages that Harry was in the yard. So a general pragmatic tendency to believe something after hearing that someone said it cannot plausibly account for Harris' findings. The low degree of discrimination Harris found between affirmative and negative non-factives probably stems from differences in both the predicates and the procedures that were used. His judgment procedure, for example, apparently led to a high degree of overaffirmation at all ages (he reports this tendency but does not give a specific breakdown). Given the sharp discrimination the Group III subjects of the present study showed between negative affirmative non-factives, and also between the negative versions of possible and true vs. think, want, and desire, children's command of factive-non-factive semantics is probably greater in middle childhood than implied by Harris' results.

Table 1 Average Number of Times the Complement was Denied[a]

	Factive Sentences		Non-Factive Sentences	
Group	Affirmatives	Negatives	Affirmatives	Negatives
I	1.10	2.65	1.90	4.50
II	0.75	2.70	1.15	4.45
III	0.80	0.95	0.90	6.35

[a] out of ten possible

Table 2 Factive Predicates[a]

Table 2a Number Passing Each Factive at Each Age

Group	know	surprising	sad	nice	happy
I (N=11)	6	5	3	4	2
II (N=15)	11	10	9	5	6
III (N=17)	15	15	26	22	21
Total (N=43)	32	30	26	22	21

Table 2b Patterns of Factive Comprehension

Comprehended Predicates	Group I	Group II	Group III	Total
surprising	1			1
know + surprising	1	1		2
know + sad	1	1		2
know + nice	1			1
know + surprising + sad		2	1	3
know + surprising + nice	1			1
know + surprising + happy		1		1
know + surprising + sad + nice		1	2	3
know + surprising + sad + happy		1		1
All Five Predicates	2	4	12	18

[a]Overaffirmers not included

2c Accuracies for Factive Predicates

(Overaffirmers not included)

Group	know		surprising		sad		happy		nice	
	Aff	Neg	Aff	Neg	Aff	Neg	Aff	Neg	Aff	Neg
I (N=11)	.86	.73	.82	.55	.60	.60	.82	.36	.91	.55
II (N=15)	.87	.87	.90	.90	.87	.80	.90	.67	.97	.63
III (N=17)	.88	.91	.90	.94	.85	.88	.94	.85	.94	.88

Table 3 Accuracies of the Nonfactive Predicates[a]

Group	think		possible		true		want		desire	
	Aff	Neg	Aff	Neg	Aff	Neg	Aff	Neg	Aff	Neg
I (N=11)	.64	.68	.64	.64	.73	.91	.64	.91	.64	.68
II (N=15)	.80	.40	.80	.53	.87	.73	.94	.83	.83	.50
III (N=17)	.91	.76	.82	.91	.95	.97	.94	.62	.88	.53

[a]Overaffirmers not included

[b]For affirmative sentences, an accurate response = affirming the complement. For negative sentences, an accurate response = denying the complement.